

To our customers,

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## Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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# NPN SILICON RF TRANSISTOR

## 2SC5180

### NPN EPITAXIAL SILICON RF TRANSISTOR FOR HIGH-FREQUENCY LOW-NOISE AMPLIFICATION 4-PIN SUPER MINIMOLD

#### FEATURES

- Low current consumption and high gain  
 $|S_{21e}|^2 = 12 \text{ dB TYP. @ } V_{CE} = 2 \text{ V, } I_c = 7 \text{ mA, } f = 2 \text{ GHz}$   
 $|S_{21e}|^2 = 11 \text{ dB TYP. @ } V_{CE} = 1 \text{ V, } I_c = 5 \text{ mA, } f = 2 \text{ GHz}$
- 4-pin super minimold Package

#### ★ ORDERING INFORMATION

Part Number	Quantity	Supplying Form
2SC5180	50 pcs (Non reel)	<ul style="list-style-type: none"> <li>• 8 mm wide embossed taping</li> <li>• Pin 3 (Base), Pin 4 (Emitter) face to perforation side of the tape</li> </ul>
2SC5180-T1	3 kpcs/reel	

**Remark** To order evaluation samples, contact your nearby sales office.  
The unit sample quantity is 50 pcs.

#### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = +25°C)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V <sub>CBO</sub>	5	V
Collector to Emitter Voltage	V <sub>CEO</sub>	3	V
Emitter to Base Voltage	V <sub>EBO</sub>	2	V
Collector Current	I <sub>c</sub>	10	mA
Total Power Dissipation	P <sub>tot</sub> <sup>Note</sup>	30	mW
Junction Temperature	T <sub>j</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-65 to +150	°C

**Note** Free air

**Caution** Observe precautions when handling because these devices are sensitive to electrostatic discharge.

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**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = +25°C)**

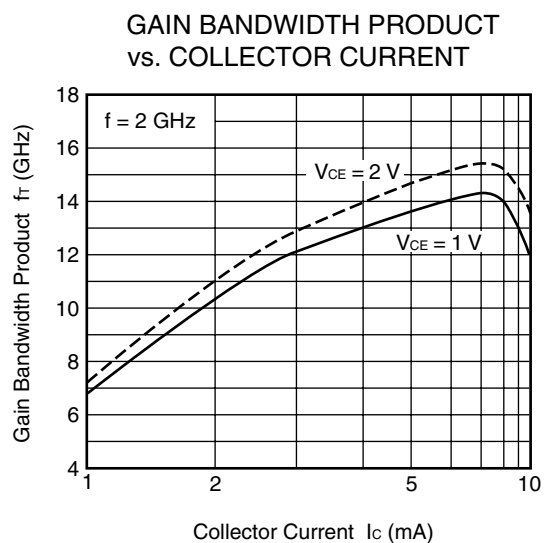
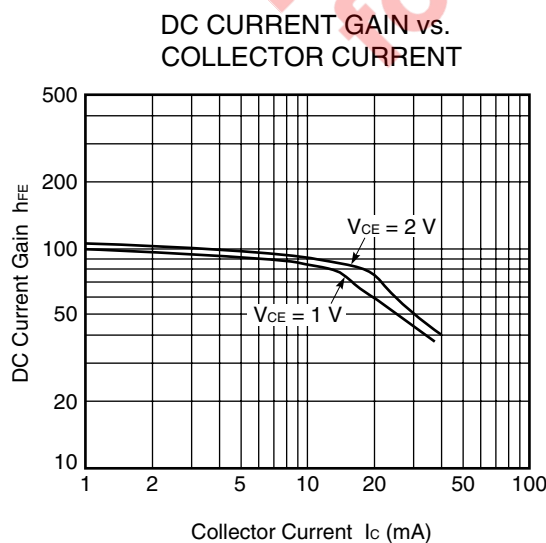
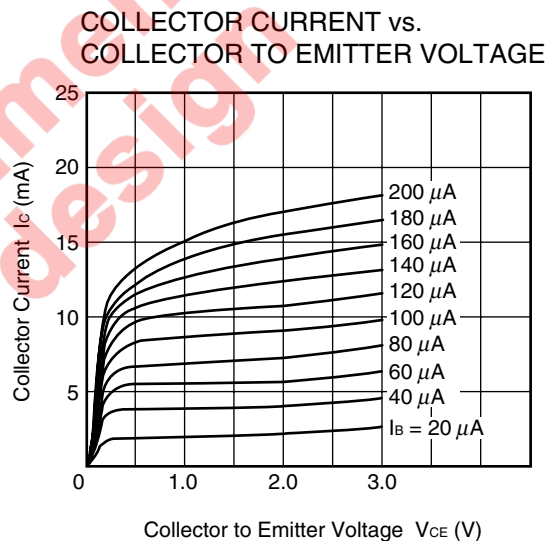
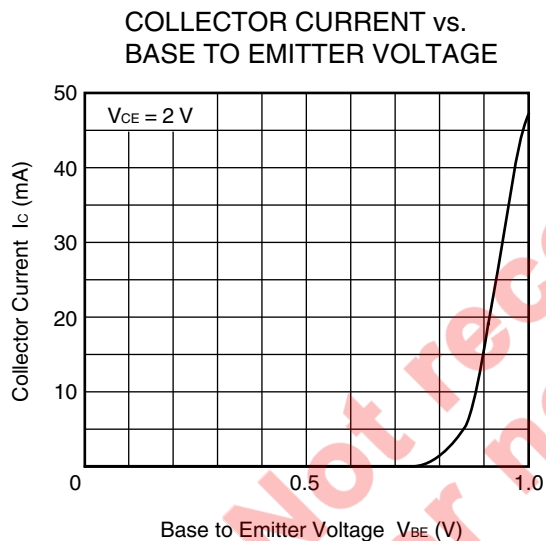
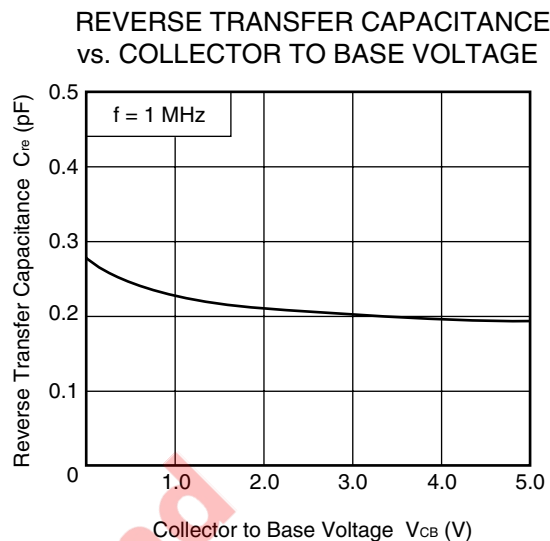
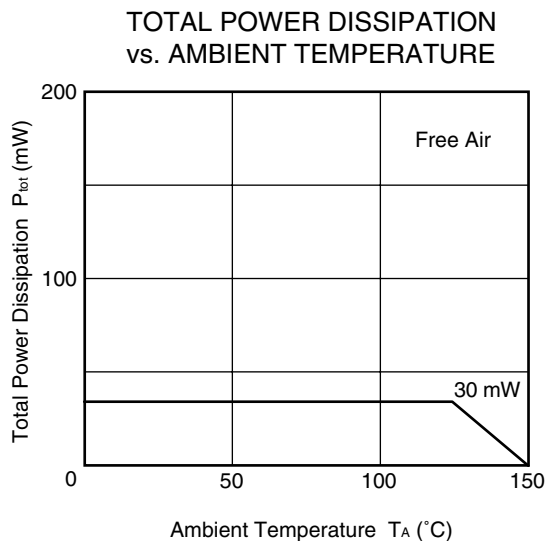
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Collector Cut-off Current	I <sub>CBO</sub>	V <sub>CB</sub> = 5 V, I <sub>E</sub> = 0 mA	–	–	100	nA
Emitter Cut-off Current	I <sub>EBO</sub>	V <sub>EB</sub> = 1 V, I <sub>C</sub> = 0 mA	–	–	100	nA
DC Current Gain	h <sub>FE</sub> <sup>Note 1</sup>	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 7 mA	70	–	140	–
RF Characteristics						
Gain Bandwidth Product (1)	f <sub>T</sub>	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 7 mA, f = 2.0 GHz	12	15.5	–	GHz
Gain Bandwidth Product (2)	f <sub>T</sub>	V <sub>CE</sub> = 1 V, I <sub>C</sub> = 5 mA, f = 2.0 GHz	10	13	–	GHz
Insertion Power Gain (1)	S <sub>21e</sub>   <sup>2</sup>	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 7 mA, f = 2.0 GHz	10	12	–	dB
Insertion Power Gain (2)	S <sub>21e</sub>   <sup>2</sup>	V <sub>CE</sub> = 1 V, I <sub>C</sub> = 5 mA, f = 2.0 GHz	8.5	11	–	dB
Noise Figure (1)	NF	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 3 mA, f = 2.0 GHz	–	1.5	2.0	dB
Noise Figure (2)	NF	V <sub>CE</sub> = 1 V, I <sub>C</sub> = 3 mA, f = 2.0 GHz	–	1.5	2.0	dB
Reverse Transfer Capacitance	C <sub>re</sub> <sup>Note 2</sup>	V <sub>CB</sub> = 2 V, I <sub>E</sub> = 0 mA, f = 1.0 MHz	–	0.3	0.5	pF

- Notes** 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%  
2. Collector to base capacitance when the emitter grounded

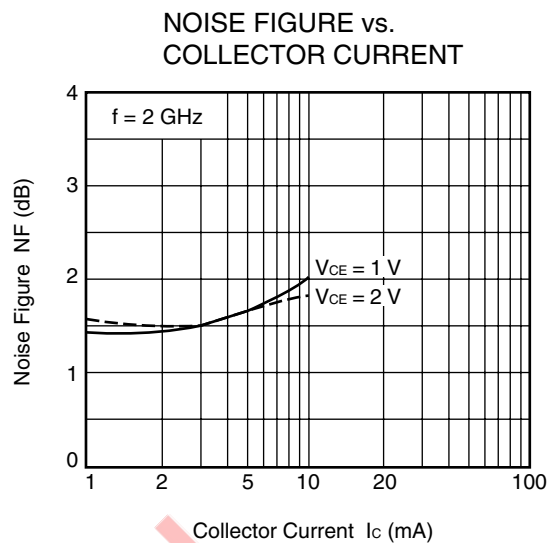
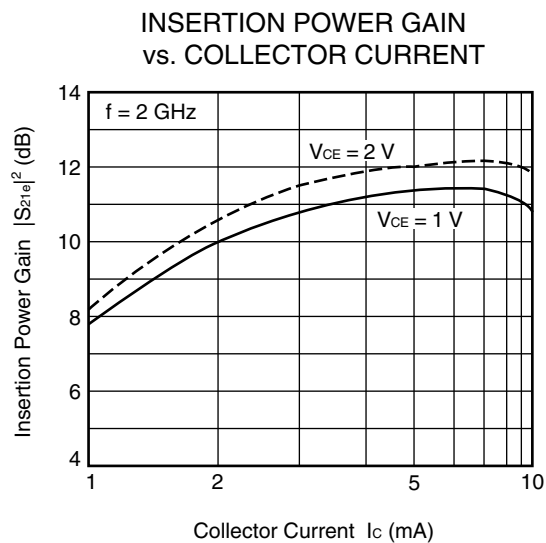
**h<sub>FE</sub> CLASSIFICATION**

Rank	FB
Marking	T84
h <sub>FE</sub> Value	70 to 140

**TYPICAL CHARACTERISTICS ( $T_A = +25^\circ\text{C}$ , unless otherwise specified)**



**Remark** The graphs indicate nominal characteristics.



**Remark** The graphs indicate nominal characteristics.

#### ★ S-PARAMETERS

S-parameters/Noise parameters are provided on the NEC Compound Semiconductor Devices Web site in a form (S2P) that enables direct import to a microwave circuit simulator without keyboard input.

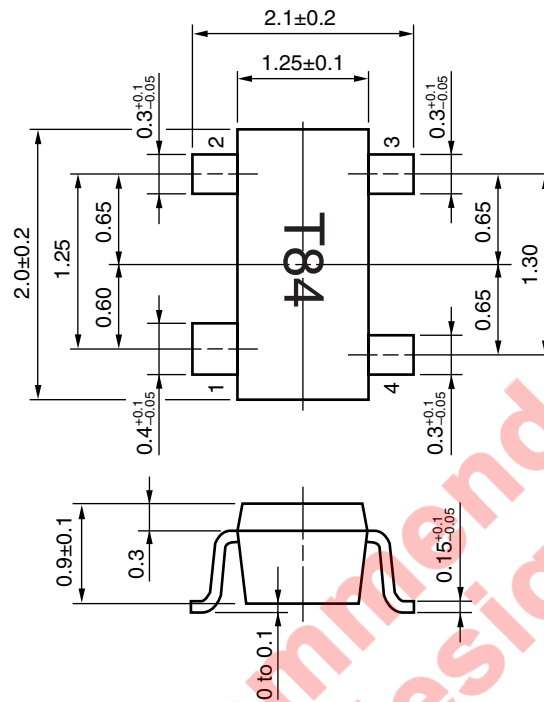
Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

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★ PACKAGE DIMENSIONS

4-PIN SUPER MINIMOLD (UNIT: mm)



PIN CONNECTIONS

1. Collector
2. Emitter
3. Base
4. Emitter

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**NEC Compound Semiconductor Devices, Ltd.** <http://www.ncsd.necel.com/>

E-mail: [salesinfo@ml.ncsd.necel.com](mailto:salesinfo@ml.ncsd.necel.com) (sales and general)

[techinfo@ml.ncsd.necel.com](mailto:techinfo@ml.ncsd.necel.com) (technical)

Sales Division TEL: +81-44-435-1588 FAX: +81-44-435-1579

**NEC Compound Semiconductor Devices Hong Kong Limited**

E-mail: [ncsd-hk@elhk.nec.com.hk](mailto:ncsd-hk@elhk.nec.com.hk) (sales, technical and general)

Hong Kong Head Office TEL: +852-3107-7303 FAX: +852-3107-7309

Taipei Branch Office TEL: +886-2-8712-0478 FAX: +886-2-2545-3859

Korea Branch Office TEL: +82-2-558-2120 FAX: +82-2-558-5209

**NEC Electronics (Europe) GmbH** <http://www.ee.nec.de/>

TEL: +49-211-6503-0 FAX: +49-211-6503-1327

**California Eastern Laboratories, Inc.** <http://www.cel.com/>

TEL: +1-408-988-3500 FAX: +1-408-988-0279